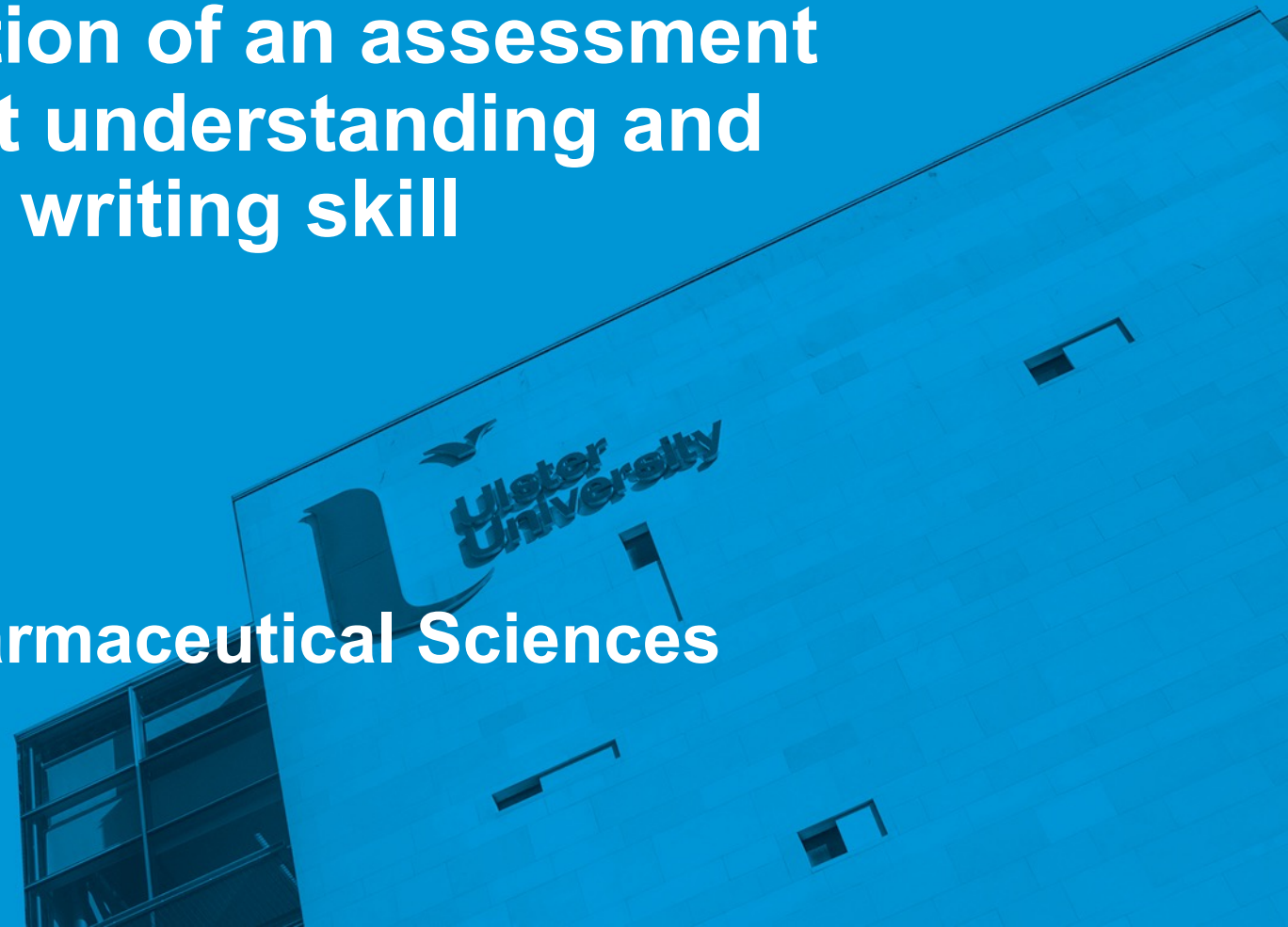




# **Development and evaluation of an assessment rubric to enhance student understanding and development of scientific writing skill**

**Dr Deborah Lowry**  
**Lecturer in Pharmaceutics**  
**School of Pharmacy and Pharmaceutical Sciences**



# Background

- Scientific writing encourages students to develop and support an argument and communicate their findings in a clear and concise manner while following specified formatting guidelines (Kalman, 2011).
- One hurdle that many instructors must overcome in teaching effective scientific writing skills is clearly communicating to students what is expected in relation to the structure and content of a scientific report (Krest and Carle, 1999)
- Assessment rubrics are tools used to accurately communicate assignment requirements by articulating the structure and components of the assignment and have been shown to increase consistency in marking.

## Aim

To evaluate the efficacy of a rubric co- designed and developed to support and improve student understanding of how to appropriately structure and write a scientific report that effectively communicates the information.

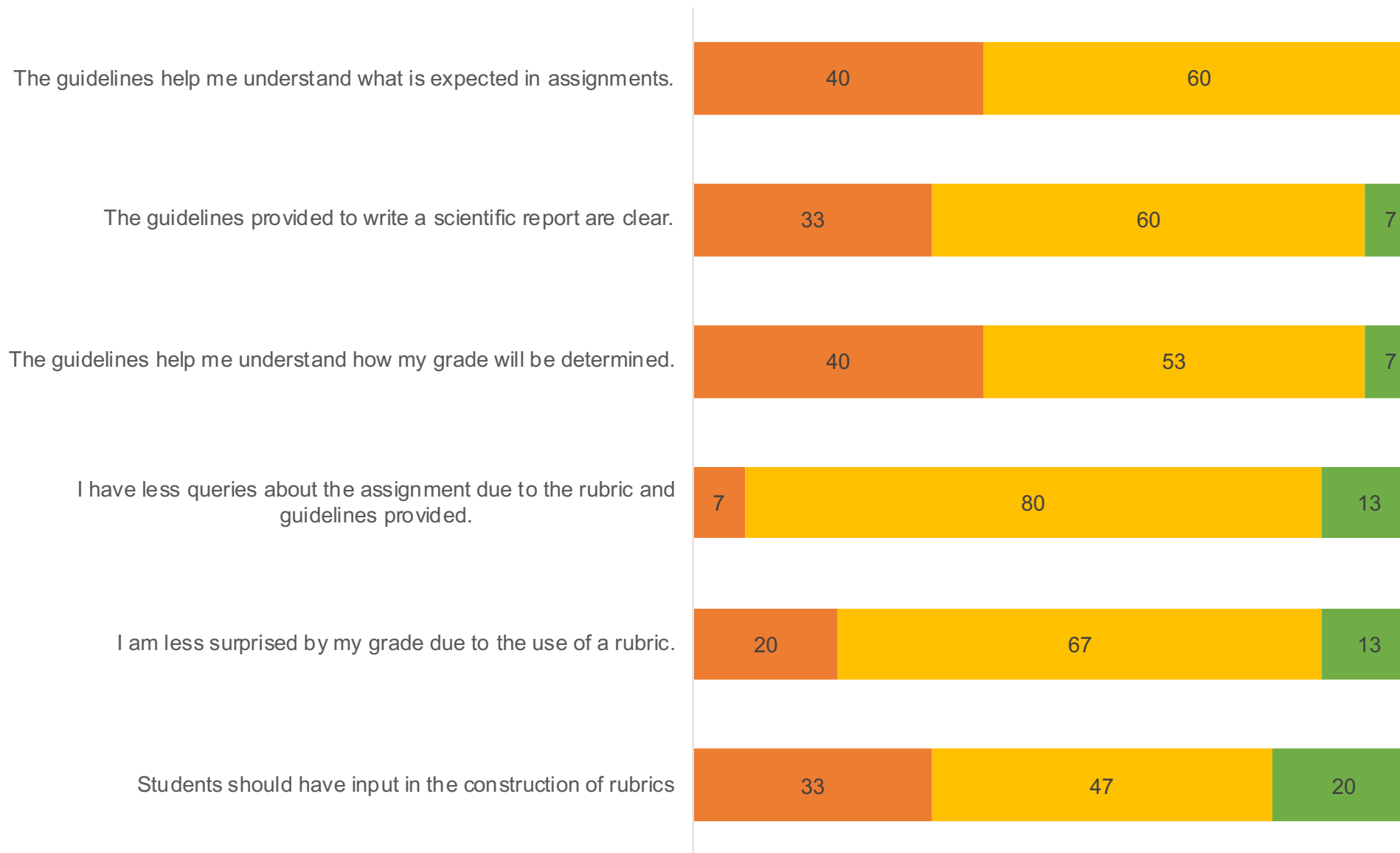
Kalman, C. (2011) Enhancing students' conceptual understanding by engaging science text with reflective writing as a hermeneutical circle *Science and Education*, 20, 159-172.

Krest, M. and Carle, D.O. (1999) Teaching scientific writing: a model for integrating research, writing, and critical thinking *The American Biology Teacher*, 61, 223-227.

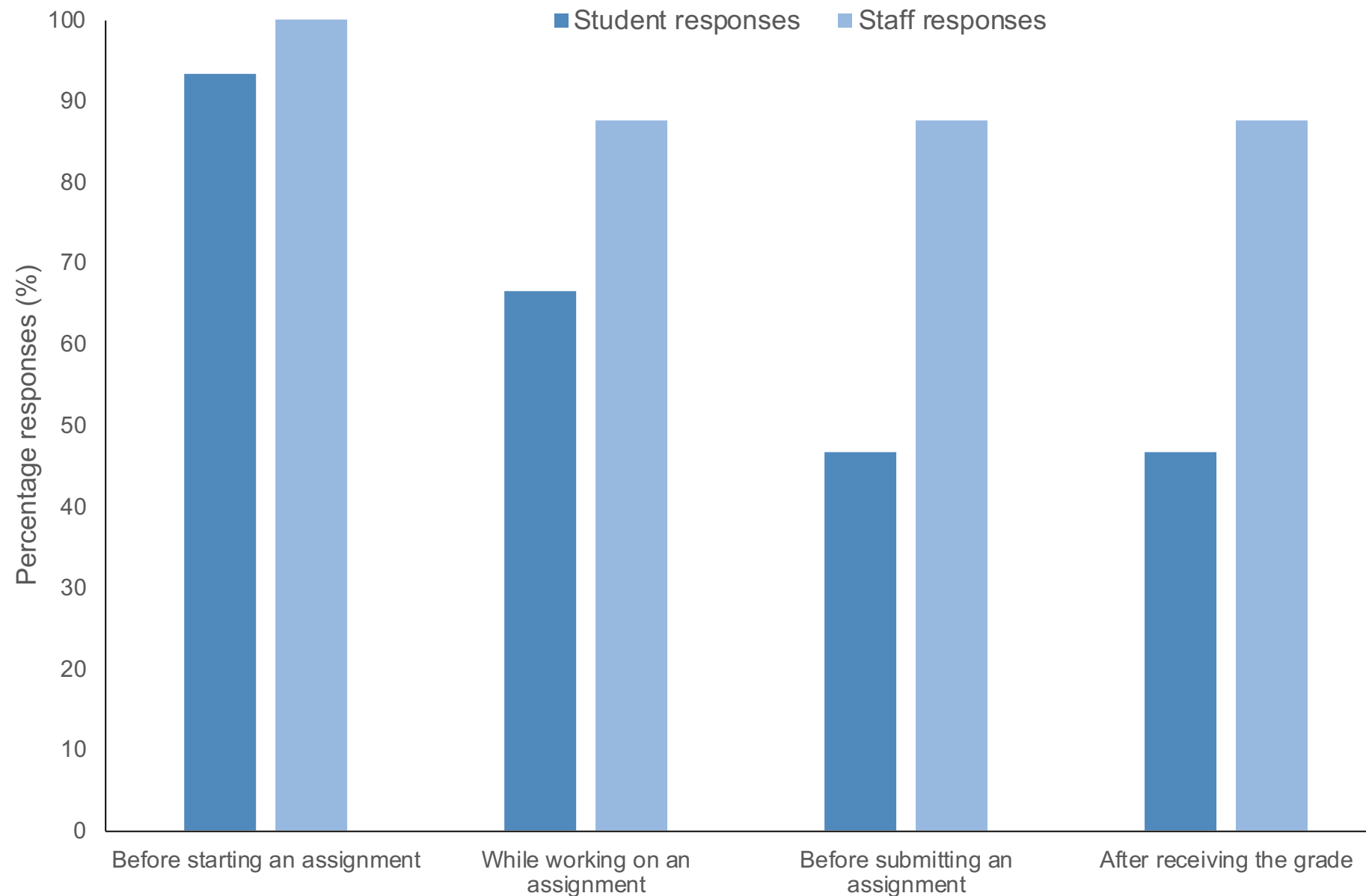
# Study Design

- Phase 1: Rubric design
  - Focus group with four lecturers in the School of Pharmacy and Pharmaceutical Sciences
  - Focus group with six MPharm students conducted by a PhD student
- Phase 2: Implementation of the rubric
  - Revised rubric was shared with all 2<sup>nd</sup> year MPharm students (n=39)
  - Criteria discussed in detail with question session for students
- Phase 3: Post implementation evaluation
  - Questionnaire to all 2<sup>nd</sup> year MPharm students (n=39)
    - Response rate 15/39
  - Questionnaire to all lecturers in the School of Pharmacy and Pharmaceutical Sciences staff (n=14)
    - Response rate 8/14
  - Report marks before and after the rubric were analysed

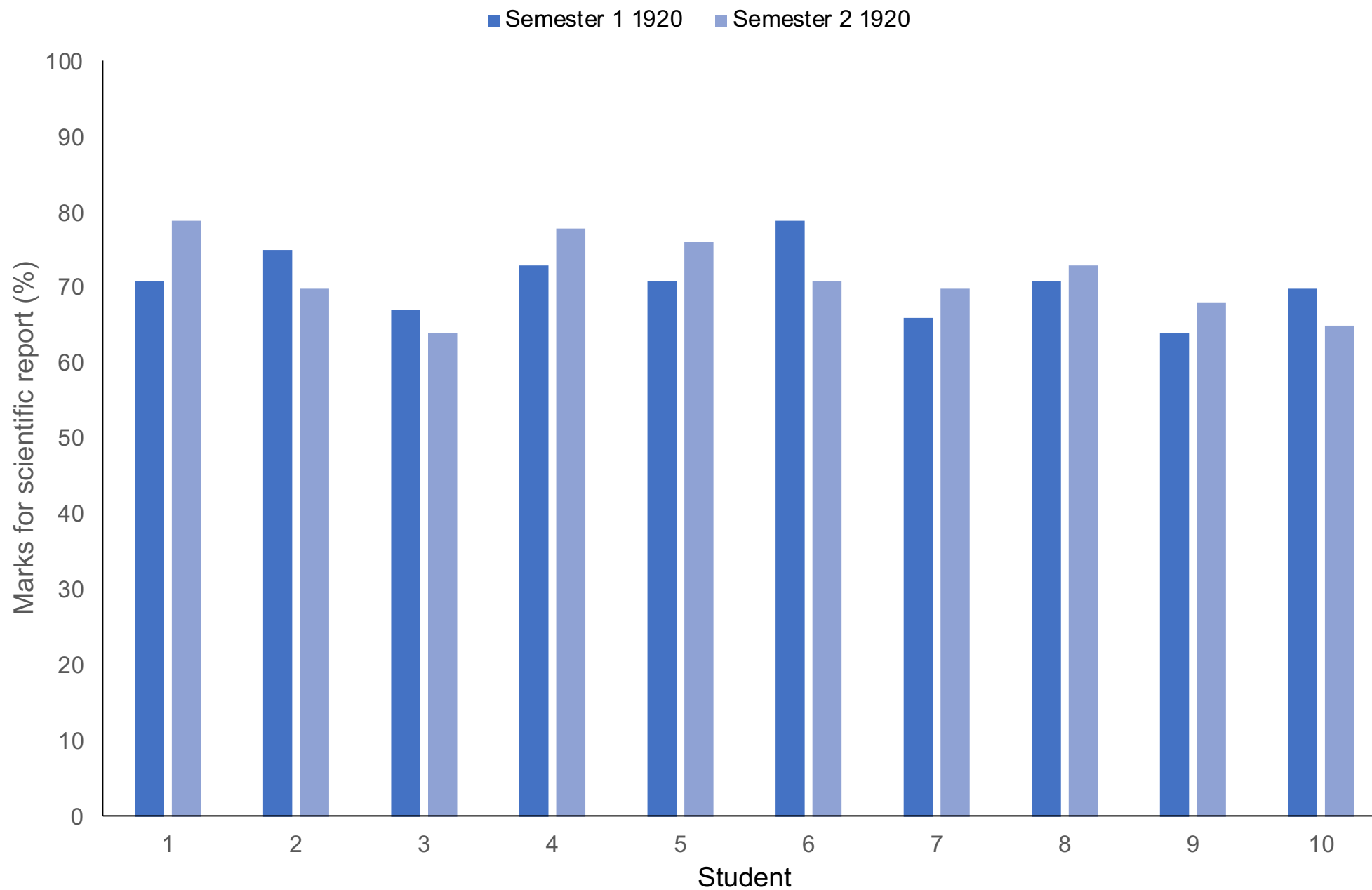
Strongly agree Agree Neutral Disagree Strongly disagree



**Percentage student responses to questions relating to the level of clarity and supportive guidance provided by the rubric before and after submission of the assessment**



**Comparison of student responses about when they have actually referred to the rubric compared to when staff would expect them to make use of the rubric.**



**Comparison of scientific report grades pre (semester 1) and post (semester 2) rubric**

# Student opinions on benefits of co-construction of rubrics



- **Benefits to students**

*‘It allows the student to understand what is being asked of the assignment and consider what is important’*

*‘Students understand a lecturers’ point of view of marking’*

*‘The rubric gets to be seen from both the student and the markers point of view to give a rounded result’*

*‘I feel the rubrics are beneficial as I know what is expected of me and what they assessor is looking for’*

- **Benefits to lecturers**

*‘The lecturers will understand what students need to complete an assignment’*

*‘Lecturers will receive better assignments as they have outlined to the students what is expected of them’*

*‘If the students were more informed on what they are being asked, it results in less time spent questioning the lecturers which is very time consuming’*

*‘Make it easier to grade having a set of guidelines to compare to’*

# Staff opinions on benefits of co-construction of rubrics



*'Rubrics would be pitched better for students'*

*"Getting students involved in construction of rubrics could help to ensure a common language so that staff and students understand exactly what is expected and is actually meant by the criteria"*

*'Will help staff communicate what is expected in assignments'*

*'It would be written in such a way that students find it very clear and is in language that they understand'*

*'Would like to see the "unexpected but really good" category of work. Not often, but occasionally, a student will show me something that I have not seen before - a new way to present something, or a new angle of argument'*



# Conclusions

## **To what extent does the rubric clearly communicate the assignment requirements for students?**

Overall student opinions on the rubric and guidelines showed that these were clear.

80% of students had less queries

All students stated that the rubric and guidelines help them understand what is expected in the assignment.

## **To what extent do students utilise the rubric to self-assess their report?**

Less than 50% of students stated they did not self-assess however 87% stated the mark received was in line with their expected mark.

## **To what extent does the rubric have an impact on student performance in scientific writing assessments?**

Overall student performance did not improve.

Less time for students to focus on the report. Blackboard Learn statistics showed the average number of hours reduced from 4.71 hours to 2.91 hours when working remotely.

# Acknowledgements



- Pharmacy students who participated in the study
- School of Pharmacy and Pharmaceutical Sciences staff